December 21, 2018

VIA ELECTRONIC MAIL
AND REGULAR U.S. MAIL

Attn: Portland Harbor Superfund Comments
U.S. Environmental Protection Agency
805 SW Broadway, Suite 500
Portland, OR 97205
Email: HarborComments@epa.gov

Re: Port of Portland Comments on Proposed Explanation of Significant Differences for the Portland Harbor Superfund Site

The Port of Portland (the "Port") appreciates the opportunity to comment on the Environmental Protection Agency's ("EPA's") Proposed Explanation of Significant Differences ("Proposed ESD") for the Portland Harbor Superfund Site ("Harbor"). The Port supports EPA's decision to incorporate the best available science in remediation of the Harbor and remains committed to a cleanup that protects the health of Portlanders and the environment.

Attached are the Port's comments on EPA's Proposed ESD. The Port's primary comment is that the Proposed ESD is inconsistent with risk management decisions made in EPA's Record of Decision ("ROD"). Specifically, EPA has selected a remedial action level ("RAL") for total polycyclic aromatic hydrocarbons ("TPAHs") that meets the cPAH-long term cleanup level at the completion of remedy construction – a requirement that does not exist in EPA's ROD. Rather, EPA's ROD allows active remediation of contamination above the RALs to meet interim risk targets. It then allows for further risk reduction over time by ongoing natural recovery processes in order to meet final cleanup levels. At Terminal 4, this inconsistency will result in active remediation of areas that already meet interim risk targets for RAO 1, as established in the ROD. This divergence from the ROD rationale is not adequately explained by the agency.

We hope that the attached comments will assist EPA in refining the Proposed ESD in a manner that is consistent with the ROD and allows for implementation of a protective, cost-effective remedy.

Sincerely,

for

Kristen Leonard
Chief Public Affairs Officer

for

Jessica Hamilton
Director, Harbor Environmental

Comments to the U.S. Environmental Protection Agency's Proposed Explanation of Significant Differences for the Portland Harbor Superfund Site

Introduction

This memorandum and the attached cover letter provide the Port of Portland's (Port's) comments on the U.S. Environmental Protection Agency (USEPA) Proposed Explanation of Significant Differences (ESD; USEPA 2018) for the Portland Harbor Record of Decision (ROD; USEPA 2017a). The proposed ESD updated certain sediment cleanup levels and remedial action levels (RALs) based on the January 2017 USEPA updates to the human health carcinogenic toxicity values for benzo(a)pyrene.[1]

The Port owns Terminal 4 (T4) on the east bank of the Willamette River between river miles (RMs) 4.2 and 5.0 (also known as Sediment Decision Unit [SDU] RM 4.5E). USEPA identified polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) as the focused contaminants of concern (COCs) at T4. The ROD includes cleanup levels applicable to nearshore sediments (including T4) representative of cancer risk-based carcinogenic polycyclic aromatic hydrocarbon (cPAH) concentrations. These comments focus on implications of the proposed ESD on design, implementation, and overall remedy effectiveness at T4 compared to that of the ROD.

Summary of Port of Portland Comments and Requests for Changes

The Port's review of and comments on the proposed ESD led to the following requests for changes to the proposed ESD:

- The Port supports USEPA's decision to incorporate the best available science at Portland Harbor, specifically the incorporation of the updated cancer slope factor (CSF) for benzo(a)pyrene in the development of cPAH sediment cleanup levels. However, the impending corresponding updates to applicable or relevant and appropriate requirements (ARARs), such as human health surface water criteria, should also be considered in USEPA's evaluation. The Port requests that USEPA anticipate and consider the likely update to the human health surface water criteria ARAR in remedy evaluations moving forward. The information today shows the site meets the surface water criteria after incorporating the updated toxicity information.
- The selection of a RAL for total polycyclic aromatic hydrocarbon (TPAH) that meets the cPAH long-term cleanup level (based on 1x10-6 risk for direct contact) at time zero is inconsistent with the risk management decisions made in the ROD and that are still in effect for PCBs and other focused COCs. This inconsistent approach results in differential treatment of contaminants

[1] In USEPA's January 19, 2017, updated *Toxicological Review of Benzo(a)pyrene (CASRN 50-32-8): Executive Summary. Integrated Risk Information System (IRIS)* (USEPA 2017b), the oral cancer slope factor (CSF) decreased from 7.3 per milligrams per kilogram-day (per mg/kg-day) to 1 per mg/kg-day.

divergent from previous decisions in the ROD. The Port requests that USEPA revise the proposed TPAH RAL to be consistent with the risk management decisions made in the ROD for selecting contaminant-focused RALs. We estimate the alternative TPAH RAL, consistent with the ROD methodology, would be 88,000 micrograms per kilogram (µg/kg). This alternative TPAH RAL would be applied in the nearshore and would achieve the same level of risk reduction and residual post-construction cPAH direct contact risk as the ROD. It would also be protective of surface water ([remedial action objective] RAO 3) and the benthic community (RAO 5) when applying the same risk management decisions established in the ROD.

- Monitored natural recovery is one of the solutions required and embraced by the ROD to efficiently and cost-effectively meet cleanup goals. At T4, the interim risk targets for RAO 1, as established in the ROD, are already met without active remediation. The ROD allows for further risk reduction over time due to ongoing natural recovery processes combined with post-construction monitoring to ensure long-term effectiveness is achieved. Interim and long-term risk management were not appropriately considered in the proposed ESD. The Port requests USEPA consider making risk management decisions consistent with the ROD.
- The ESD cleanup level for RAO 2 protective of clam consumption by humans (1,076 µg/kg cPAH) has become more important in driving cleanup decisions at T4, although direct contact remains the more stringent RAO. However, the clam consumption pathway at T4 is incomplete due to site-specific factors such as site terminal operations, prevailing water depths, and Port security protocols. The Port requests that USEPA consider making a site-specific risk management decision that human clam-consumption risk is inapplicable to the remedy selection and design at T4.

Port of Portland Comments

1. Support for the Use of Best Available Science

The Port supports the decision by the USEPA to issue a proposed ESD based on the update to benzo(a)pyrene toxicity information published by the USEPA Integrated Risk Information System (IRIS).

IRIS provides human health toxicity information for hundreds of chemicals and is periodically updated through a step-wise peer-reviewed process to evaluate new toxicity data. These revisions can significantly impact the cleanup process, including calculation of human health risk and delineation of sediment management areas requiring active remediation. Many state and federal programs utilize IRIS as the source of risk-based screening values, including Oregon Department of Environmental Quality risk-based concentrations (RBCs; DEQ 2018)[2] and USEPA regional screening

[2] The status of Oregon Department of Environmental Quality updates to state water quality criteria are uncertain but when updated will likely include the new toxicity information for benzo(a)pyrene.

levels (RSLs). Benzo(a)pyrene-related human health risk-based values under these programs have already been updated to address the 2017 IRIS update (USEPA 2017b).

Sediment and riverbank soil cPAH cleanup levels for Portland Harbor (expressed as benzo(a)pyrene equivalents) presented in the ROD are based on preliminary remediation goals (PRGs) developed using the 1987 benzo(a)pyrene toxicity values (representing $1x10^{-6}$ target risk level), rather than the updated 2017 benzo(a)pyrene toxicity values, which were finalized while the ROD was in development. The peer-reviewed draft of the benzo(a)pyrene update was released in 2014. The final version was released on January 19, 2017, shortly after the Portland Harbor ROD (released on January 3, 2017).

Issuance of an ESD based on updates to toxicity values is consistent with USEPA guidance, which allows for recalculation of cleanup levels and changes to ROD decisions based on evaluation of the latest science. USEPA acknowledges that new information can affect implementation and/or reassessment of the remedy (USEPA 1999).

2. Support for the Revised cPAH Cleanup Levels and Principal Threat Waste Threshold

The Port supports the recalculation of the sediment cleanup levels and the associated highly toxic principal threat waste (PTW) concentration[3] for cPAH based on updated IRIS values as presented in the proposed ESD. The calculations described in the proposed ESD accurately reflect the outcome of using a lower CSF for benzo(a)pyrene from 7.3 per milligrams per kilogram-day (per mg/kg-day) to 1 per mg/kg-day to calculate an updated sediment cleanup level. A lower CSF reduces risks and thus results in higher cleanup levels.

In addition, the Port supports the clarification in the proposed ESD regarding the application of the cPAH human health direct contact cleanup level for beach sediment. The revisions in the proposed ESD are consistent with how the remedy was selected in the ROD and with the exposure pathways evaluated in the Baseline Human Health Risk Assessment (BHHRA; Kennedy/Jenks 2013), which are based on application of the RAO 1 cPAH PRG of 106 µg/kg for human direct contact exposure to submerged nearshore sediments, updated to 774 µg/kg based on the 2017 benzo(a)pyrene CSF revision.

3. Proposed Explanation of Significant Differences Remedy Is Inconsistent with the Risk Management Basis Set Forth in the Record of Decision

The Port supports the recalculation of cPAH risk-based cleanup and PTW levels and agrees that those revisions require modifications to the selected remedy. However, the methodology (including

[3] Proposed ESD Figures 3 and 8 do not appear to have been updated and should be updated to reflect the cPAH PTW changes.

risk management criteria) in the proposed ESD is inconsistent with the method used in the ROD. The key inconsistencies between the proposed ESD and ROD methodology include the following:

- The proposed ESD uses different risk management criteria for developing and selecting a total PAH (TPAH) RAL than in the ROD, with no meaningful harbor-wide cumulative risk-reduction benefit.
- The proposed ESD does not consider expected changes to human health surface water PAH cleanup levels, which would similarly be affected by the benzo(a)pyrene IRIS toxicity revision.
- The proposed ESD alleges that the increase in the TPAH RAL is limited by consideration of benthic risk, yet the benthic risk reduction goal established in the ROD is achieved regardless of the TPAH RAL adjustment.

a. New TPAH Remedial Action Level Results in Active Remediation of Areas that Already Meet Interim Risk Targets for Remedial Action Objective 1

A new TPAH RAL is warranted and justified considering the updates to the cPAH cleanup levels. Development of RALs are based on the cleanup levels established by USEPA. Therefore, higher cleanup levels require less active cleanup to meet post-construction goals, reflected in higher RALs. However, the risk management criteria used in the ESD are inconsistent with those used in the ROD.

Effectively, the proposed ESD TPAH RAL meets the updated direct contact nearshore sediment cleanup level (774 µg/kg cPAH) at time zero in all RMs (e.g., proposed ESD Figures 4a and 4b), when the selected remedy in the ROD did not. Specifically, the following can be stated:

- The new TPAH RAL in the ESD results in the achievement of cPAH risk levels of 1×10^{-6} (Figure 1)[4] and cumulative risk levels of approximately 5.5×10^{-6} at time zero in all of Portland Harbor (as shown in proposed ESD Figures 9a and 9b)[5]. In contrast, the ROD included the concept of achievement of interim target cumulative risk levels of 1×10^{-5} at time zero, with allowance for subsequent post-construction risk reduction due to ongoing natural recovery.
- The ESD remedy results in more cleanup of cPAH (meeting 1×10^{-6} risk) relative to what was in the ROD. For PCBs, USEPA selected a RAL that results in a post-construction surface-weighted average concentration (SWAC) more than twice the cleanup level at T4, and post-construction PCB risks up to 1×10^{-4} remain in other parts of the harbor. The fact that even the long-term cleanup level for PCBs will result in human health fish consumption risks exceeding 1×10^{-6} (in fact more than 1×10^{-5} risk) is even more incongruous with the ESD decision to meet cPAH cleanup levels (1×10^{-6} risk) at time zero.
- Because the newly proposed TPAH RAL is inconsistent with risk management decisions made in the ROD, areas that already meet interim risk targets set for RAO 1 in the ROD will require

[4] Updated post-construction cPAH surface-weighted average concentration (SWACs) for the ESD remedy do not appear to have been provided in the ESD. Anchor QEA, LLC, calculated post-construction SWACs following the ESD proposed remedy using USEPA's Natural Neighbor Surfaces; ESD RALs and PTW; and USEPA's ROD methodology for SWAC calculation.

[5] Though cumulative risks are presented in the ESD, interim targets as effectiveness criteria (as discussed in the ROD) were not discussed in the ESD.

active remediation. This result requires the significant expenditure of public funds with no meaningful harbor-wide cumulative risk-reduction benefit.

b. An Alternative TPAH Remedial Action Level Is Consistent in Achieving a Comparable Level of Post-Construction Risk Reduction as in the Record of Decision

Table 1 compares the post-construction cPAH SWAC at T4 to the cleanup level in the ROD and in the proposed ESD. In the ROD, the selected remedy resulted in a post-construction SWAC approximately 3 times greater than the ROD cleanup level, whereas the proposed ESD remedy meets the cleanup level at time zero, as discussed in Comment 3a.

A revised TPAH RAL applicable to T4 should be more appropriately identified through achievement of a comparable level of post-construction risk reduction and residual risk as that of the ROD-selected remedy. As shown in Figure 1, this evaluation focuses on the 0.5-RM reach within the T4 SDU with the highest existing cPAH concentrations (RM 4.7E). In the ROD, the post-construction SWAC for the selected remedy at RM 4.7E is 337 µg/kg cPAH—3.2 times the RAO 1 PRG (Table 1). In contrast, the proposed ESD remedy results in a SWAC meeting the cleanup level at time zero, with a post-construction SWAC of 0.9 times the RAO 1 PRG. The post-construction 0.5-RM SWAC at RM 4.7E would need to be approximately 2,477 µg/kg to achieve the same level of risk reduction as the ROD selected remedy (i.e., 3.2 times the new CUL) of 774 µg/kg). Anchor QEA, LLC, identified that a revised nearshore RAL of 88,000 µg/kg TPAH[6] would result in a 0.5-RM SWAC at RM 4.7E of approximately 2,440 µg/kg. That is, a RAL of 88,000 µg/kg (replacing the proposed ESD RAL of 30,000 µg/kg) would achieve essentially the same level of risk reduction as the ROD selected remedy (Table 1).

For RAO 1 in the Feasibility Study (FS), the interim target is 1×10^{-5} cumulative risk (i.e., the total risk of all COCs evaluated in the FS) on a 0.5-RM basis. An alternative was considered effective in the FS if interim targets were met. The proposed ESD does not incorporate the interim target in the same manner as in the ROD. Nor does the proposed ESD acknowledge that Alternative A (No Action) actually meets the RAO 1 interim target using the updated cleanup level. According to the FS interpretation of interim targets, meeting the RAO 1 interim target suggests that T4 direct contact PAH risks will be reduced to acceptable levels within a reasonable time frame without active remediation, and the T4 sediment management area would be defined solely by other T4 COCs, particularly PCB RALs. Therefore, adjusting the RAL to 88,000 µg/kg TPAH would represent a remedy that is consistent with the acceptability criteria used in the ROD and protective for PAHs.

[6] The TPAH RAL of 88,000 µg/kg and the cPAH SWAC of 2,440 µg/kg were estimated consistent with USEPA's methodology used in the ROD using GIS and USEPA's Natural Neighbor Surfaces for RAL chemicals.

c. Effects on Other Exposure Pathways

USEPA's development of a revised TPAH RAL in the proposed ESD takes into account potential impacts on other RAOs as follows:

> Although not directly related to a CSF or a measurement of risk, [US]EPA evaluated potential implications of the BaP [benzo(a)pyrene] slope factor change on the total PAH RALs selected in the ROD to determine whether any areas slated for active cleanup primarily or solely due to cPAH risk from direct contact with contaminated sediments or shellfish consumption no longer presented risk or may no longer require active cleanup. However, while undertaking this review, [US]EPA also considered the effect of these changes on other human health and ecological RAOs. In particular, [US]EPA evaluated impacts to surface water CULs [cleanup levels] and whether ecological risks presented by PAHs, carcinogenic or not, would be adequately addressed if changes to cPAH CULs and/or the total PAH RALs were implemented. (ESD, page 20)

However, neither surface water nor benthic risk should be a limiting factor in setting TPAH RALs, as detailed in the following:

- **Surface Water (RAO 3).** The proposed ESD limits the nearshore TPAH RAL increase on the basis of having to meet cleanup levels based on ARARs for cPAH in surface water, while recognizing that these ARARs have not yet been updated with the new IRIS CSF. This suggests that the remedy must meet ARARs established using the outdated standards because federal ambient water quality criteria (AWQC) have not yet been updated. However, USEPA's water quality group has indicated they plan to update the federal criteria (USEPA 2015) once the IRIS update for benzo(a)pyrene was finalized, so the AWQC are likely to be updated soon.

  The status of the update to the Oregon human health criteria is uncertain, but Oregon has already updated its risk-based soil and groundwater concentrations in the cleanup program to incorporate the new IRIS CSF. Therefore, this is only a temporary administrative inconsistency until the state and federal surface water ARARs are updated. As shown in FS Figure 4.2-8b (as updated in the ROD), average site cPAH surface water concentrations (approximately 0.00075 µg/L) are already less than the anticipated update to the federal AWQC (which is expected to increase from 0.00012 µg/L to approximately 0.00088 µg/L).

  The Portland Harbor BHHRA evaluated risks from exposure to surface water during recreational or occupational activities or from potential future use of the Lower Willamette River as a domestic water source. The BHHRA estimated risks from surface water exposures

based on transect data and single point sampling locations, as well as risks averaged over a Study Area-wide basis depending on the exposure scenario and receptor evaluated.

At RM 4.5 E, the BHHRA evaluated risks to commercial divers in wet suits and dry suits from exposure to surface water separately and found that carcinogenic risks and noncarcinogenic hazards were in the acceptable risk ranges for both scenarios. This result was based on exposure to cPAHs and arsenic using the old benzo(a)pyrene CSF. If the updated CSF were used, the estimated cancer risks would be even lower for these two scenarios. The BHHRA evaluated potential risks from surface water exposure to recreational beach users and transients, but none of these scenarios included surface water data from areas near T4 because recreational beaches were identified and the chemicals of potential concern evaluated in these risk calculations did not include cPAHs. Thus, there are no unacceptable risks from surface water exposures to cPAHs for scenarios evaluated at or near T4.

For cPAH, all FS alternatives, including the No Action Alternative, met the interim target risk level for RAO 3 at 10 times the ROD cleanup level. Therefore, RAO 3 should not be a limiting factor for adjusting the value of the TPAH RAL.

- **Benthic Risk (RAO 5).** Based on USEPA's methods for evaluating benthic risk, the proposed ESD results in a negligible change to benthic risk from that of the ROD selected remedy. The ROD goal is to protect 50% of the benthic risk area defined by 10 times benthic PRGs,[7] which is expected to protect the benthic population as a whole. Per the ROD, the remainder of benthic risk would be addressed through monitored natural recovery. The benthic risk area addressed by the remedy was marginally reduced from 72% to 69% of the site (proposed ESD Table 4). According to the ROD (Appendix IV, Table 4.2-7), a TPAH RAL of 69,000 µg/kg (Alternative D) meets the RAO 5 goal, and a TPAH RAL of 170,000 µg/kg (Alternative B) nearly meets the RAO 5 goal by achieving a 48% reduction in benthic risk area. Therefore, benthic risk is not a significant factor in the revision of the cPAH RAL adjustments. Specifically, a nearshore RAL of 88,000 µg/kg, as proposed in Comment 3 in combination with the remainder of the ESD remedy, would still address more than 50% of the benthic risk area (approximately 64%[8]) and would be protective of RAO 5. Therefore, RAO 5 should not be a limiting factor for adjusting the value of the TPAH RAL.

[7] The area exceeding 10 times RAO 5 PRGs is estimated to equal 117 acres based on Anchor QEA digitization of USEPA ROD Appendix IV, Figure 4.2-25a.

[8] A nearshore TPAH RAL of 88,000 µg/kg applied with the remainder of the ESD active remedy would result in addressing approximately 75 acres of USEPA's benthic risk area of 10 times RAO 5 PRGs.

4. Site-Specific Considerations Associated with Implementation of the Proposed Explanation of Significant Differences Remedy

In addition to the prior comments on the ESD specific to consistency with the ROD (Comment 3), the Port provides the following comments specific to the applicability of the ESD remedy to T4.

a. Clam Consumption at Terminal 4 Is an Incomplete Exposure Pathway

The ROD provides flexibility in the application of RAOs and RALs based on site-specific considerations. Site-specific considerations are especially important with respect to the clam consumption exposure pathway (RAO 2) and associated cleanup levels, and the significance of the RAO 2 cleanup levels in the nearshore areas at T4 has increased as a result of the proposed ESD changes.

The proposed ESD presents the updated clam consumption sediment cleanup level of 1,076 µg/kg and states that this cleanup level is applicable to the entire Portland Harbor Superfund Site, including T4. However, there is considerable uncertainty in the clam consumption-based sediment cleanup level for cPAHs derived using the statistically weak correlation between sediment and clam tissue for benzo(a)pyrene (regression coefficient [r2] = 0.36; Windward 2015). The Port believes that the clam consumption exposure pathway is incomplete at T4 and is not representative of site conditions that restrict access, harvesting, and consumption. The Port requests that USEPA consider making a site-specific risk management decision that human clam-consumption risk is inapplicable to the remedy selection and design at T4.

b. Restricted Site Access

Access by the public to clams at T4 is severely limited because the Port operates an active, secure marine terminal facility, which is subject to regulation under the Marine Transportation Security Act and the Port's Facility Security Plan, as required by 33 Code of Federal Regulations [CFR] Part 105. The Port's Facility Security Plan, approved by the U.S. Coast Guard, is classified as sensitive security information and controlled under 49 CFR Parts 15 and 1520.

The Port's marine security officers patrol T4 24 hours per day and 7 days per week. Security officers will direct unauthorized vessels to depart when they impact Port operations, including vessel berthing operations, and will observe and request that unauthorized vessels depart at other times. Port security officers may seek assistance from the U.S. Coast Guard or local law enforcement, as needed, to enforce its security protocols.

In addition, Berths 410 and 411 in Slip 3 are the most active berths in Portland Harbor, with an 80% vessel occupancy rate (approximately 290 days per year), which physically obstructs public access to these busy and important operational areas.

c. Unrepresentative Exposure Assumptions

The exposure assumptions used in the ROD to establish the clam consumption sediment cleanup level was based on the consumption of 3.3 grams per day of clams for 350 days/year (approximately 2.5 pounds per year from T4). It would be impossible for an individual to access T4 for such an extended duration of time to harvest clams to meet this consumption rate. Moreover, the clams would need to be harvested by divers given the prevailing water depths at the terminal, providing a further impediment to access, harvesting, and consumption on a regular basis.

d. Existing Institutional Controls

Existing institutional controls are in place to prohibit clam harvesting at T4 and other parts of the harbor. Oregon law (Oregon Administrative Rule 635-056-0000) prohibits the possession, transportation, and sale of non-native wildlife, and the predominant species found in the Lower Willamette River during Remedial Investigation sampling events were Asian clams (*Corbicula fluminea*), which are an invasive, non-native species. In addition, Oregon Sport Fishing Regulations state that it is illegal to harvest or possess any freshwater clams and mussels (ODFW 2018). This is a statewide regulation.

e. Consistency with Baseline Human Health Risk Assessment

The BHHRA calculated cancer risks and noncancer hazards for clam consumption on a RM basis for each side of the river for the reasonable maximum exposure and central tendency exposure (CTE) scenarios. The CTE scenario is the basis for the derivation of the clam consumption sediment cleanup level in the ROD.

For T4 (RM 4E), the BHHRA reported a CTE clam consumption total cPAH cancer risk of 2E-06 using the older benzo(a)pyrene CSF. If the updated benzo(a)pyrene CSF was used, the CTE clam consumption risk would be reduced to 3E-07. The CTE clam consumption scenario does not have an unacceptable cancer risk for total cPAHs using the updated benzo(a)pyrene CSF (i.e., cancer risk is less than 1E-06). Thus, even if there were a complete exposure pathway, the cleanup of sediments at T4 to address clam consumption risks is unnecessary. Moreover, cPAH represents only a small portion of the RAO 2 cumulative risk and should therefore not have a disproportionate focus in the allocation of cleanup resources (Figure 2).

5. Technical Inconsistencies in Proposed Explanation of Significant Differences Supporting Information

The following are specific comments on key supporting materials presented (or absent) from the proposed ESD:

- **Proposed ESD Figure 6.** The site-wide TPAH RAL curve was not updated to reflect the revised cleanup level or the new TPAH RAL. This figure should be updated to accurately reflect the updated direct contact cleanup level.

- **Proposed ESD Figures 4a and 4b.** Some of the information provided in the proposed ESD cannot be verified and does not appear consistent with the evaluations presented in the ROD, such as the following:

  > As shown on proposed ESD Figures 4a and 4b, one-half rolling river mile SWACs, if the Alternative F total PAH RAL is used, would exceed 774 µg/kg between approximately RM 4.8 and 6.6 in nearshore sediments along the west shore of the Willamette River (West Shoal) and between approximately RM 3.9 and 4.9 along the east shore of the Willamette River (East Shoal). (ESD, page 24)

  There are several outstanding questions/issues with these figures and their support of the ESD remedy. First, contrary to the prior quoted ESD text, Figures 4a and 4b show that no post-construction SWACs exceed the nearshore sediment cleanup level of 774 µg/kg at the Alternative F PAH RAL (i.e., the black dashed line is below the updated cleanup level line at all locations). Second, it is unclear from proposed ESD Figures 4a and 4b whether the post-construction SWACs shown are the result of application of the PAH RAL only, or as with the ROD Appendix J, the result of the application of all COC RALs. Anchor QEA calculated post-construction SWACs[9] for the ESD remedy (since they were not provided in the ESD) and, consistent with proposed ESD Figure 4b, did not identify any 0.5 RM SWACs on the east side of the river that exceed 774 µg/kg cPAH.
- **Proposed ESD Figure 5.** This figure appears to be inaccurate. According to the description provided on ESD page 24, the Port understands this figure shows the percentage of 0.5 RM segments[10] protected by various TPAH RALs (i.e., the percentage of RMs with post-construction SWACs less than the direct contact cleanup level) and is used to support limiting the TPAH RAL to 30,000 µg/kg. Comments referring to specific elements of this figure, and the corresponding text in the proposed ESD, include the following:
  - **"This evaluation is consistent with the direct contact residual risk evaluation presented in Appendix IV of the Portland Harbor ROD."** Although Appendix IV of the ROD includes 0.5 RM post-construction risks for each COC and alternative, there is no graph similar to proposed ESD Figure 5 in the ROD, nor is there a discussion of the decision criteria used to establish the acceptable number of RM segments that must meet the cleanup level at time zero. In addition, the source of the blue line in proposed ESD Figure 5 is unclear.

[9] SWACs were estimated consistent with USEPA's methodology used in the ROD using GIS and USEPA's Natural Neighbor Surfaces for RAL chemicals.

[10] It is unclear how many segments were evaluated, especially since proposed ESD Figures 4a and 4b show data for RMs outside of the site boundary.

- **"As is shown in proposed ESD Figure 5, a total PAH RAL of 95,000 µg/kg will protect 22% of nearshore half-river miles."** Since post-construction SWACs associated with a TPAH RAL of 95,000 µg/kg and 30,000 µg/kg were not provided in the proposed ESD, we could not independently verify whether 22% of nearshore half-RMs associated with a PAH RAL of 95,000 µg/kg had post-construction SWACs less than the revised cleanup level. However, according to the SWACs provided in FS Appendix J, approximately 86% of 0.5 RM segments along the east and west sides of the river (172 segments out of 200) had post-construction SWACs less than the revised cPAH cleanup level (774 µg/kg) in Alternative B, which corresponds to a TPAH RAL of 170,000 µg/kg. Therefore, it is unclear how a substantially lower number of segments (22%) are shown to meet the cPAH cleanup level for a lower TPAH RAL. Furthermore, more river segments and a larger proportion of the Portland Harbor meet the revised ESD cleanup level than the number of segments meeting the ROD cleanup level at the ROD RAL, again emphasizing the difference in risk management criteria between the ESD and the ROD (see also Comment 3a).

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Table

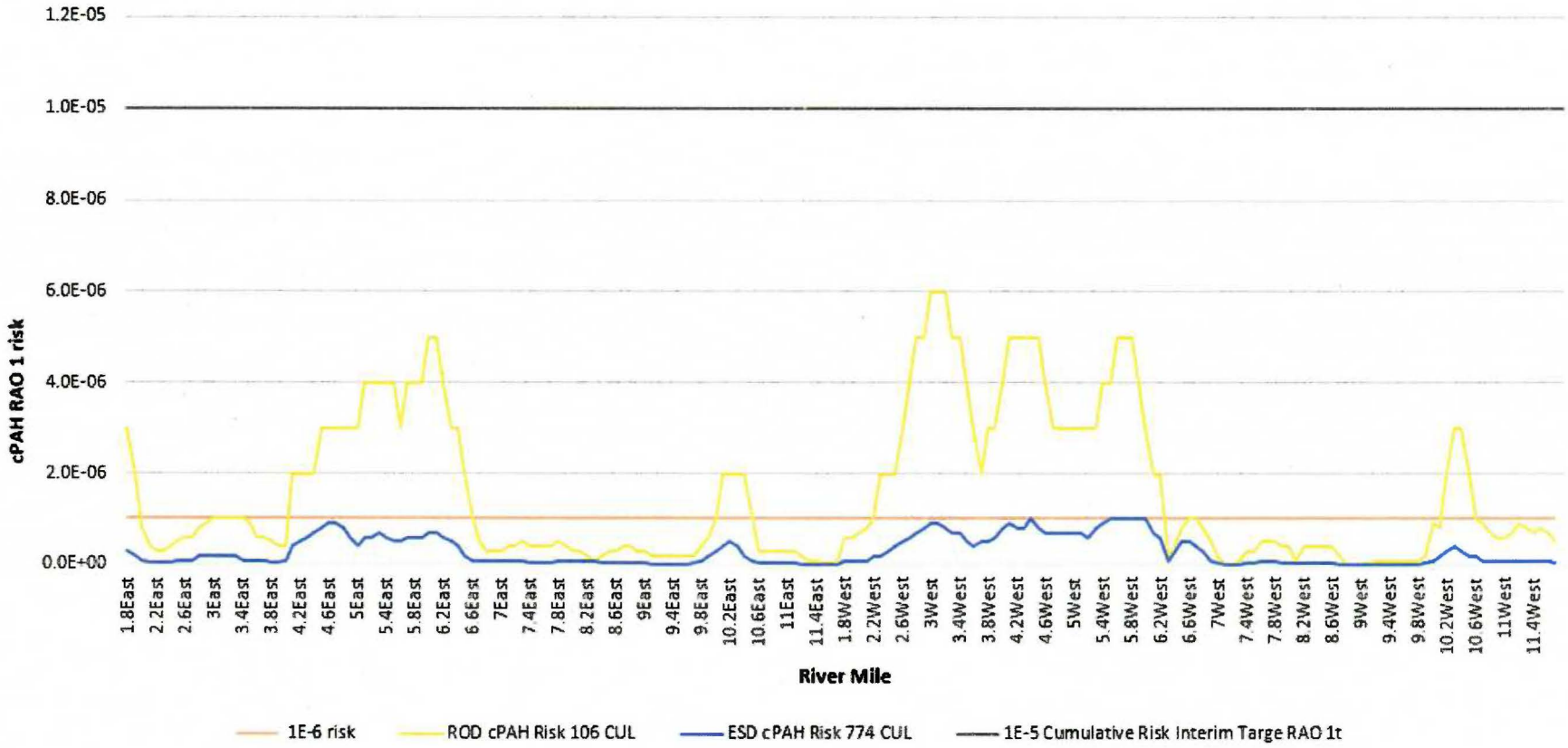
Table 1
Post Construction SWACs at Terminal 4
RM 4.5E Sediment Decision Unit

Human Health Ingestion/Direct Contact Scenario	Surface-Weighted Average Concentrations at Terminal 4						
	Existing[1]	USEPA ROD Remedy[1] TPAH RAL of 13,000 µg/kg, plus Alternative F Modification for PCBs		Anchor QEA IRIS-Revised TPAH RAL TPAH RAL of 88,000 µg/kg, plus Alternative F Modification for PCBs		USEPA Proposed ESD TPAH RAL of 30,000 µg/kg, plus Alternative F Modification for PCBs	
	cPAH SWAC (0.5 RM)[2] (µg/kg)	cPAH SWAC (0.5 RM) (µg/kg)	SWAC/USEPA ROD In-Water PRG (106 µg/kg cPAH)	cPAH SWAC (0.5 RM) (µg/kg)[3]	SWAC/Revised In-Water PRG (774 µg/kg cPAH)	cPAH SWAC (0.5 RM) (µg/kg)[3]	SWAC/Revised In-Water PRG (774 µg/kg cPAH)
Tribal Fisher In-Water	4,958	337	3.2	2,440	3.2	694	0.9

Notes:
1. SWACs are from FS Appendix J (as updated in the ROD).
2. Shown for the 0.5 RM with the highest existing cPAH concentration (RM 4.7E).
3. SWAC estimated by Anchor QEA using USEPA Natural Neighbor Surfaces and following ROD methodology for SWAC calculation.

Abbreviations:
µg/kg: micrograms per kilogram
cPAH: carcinogenic polycyclic aromatic hydrocarbon
ESD: Explanation of Significant Differences
FS: Feasibility Study
IRIS: Integrated Risk Information System
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal
RAL: remedial action level
RM: river mile
ROD: Record of Decision
SWAC: surface-weighted average concentration
TPAH: total polycyclic aromatic hydrocarbon
USEPA: U.S. Environmental Protection Agency

Figures



Notes:
ROD risk from ROD Appendix J, Table J2.2-1c.
ESD risk estimated by Anchor QEA, LLC.

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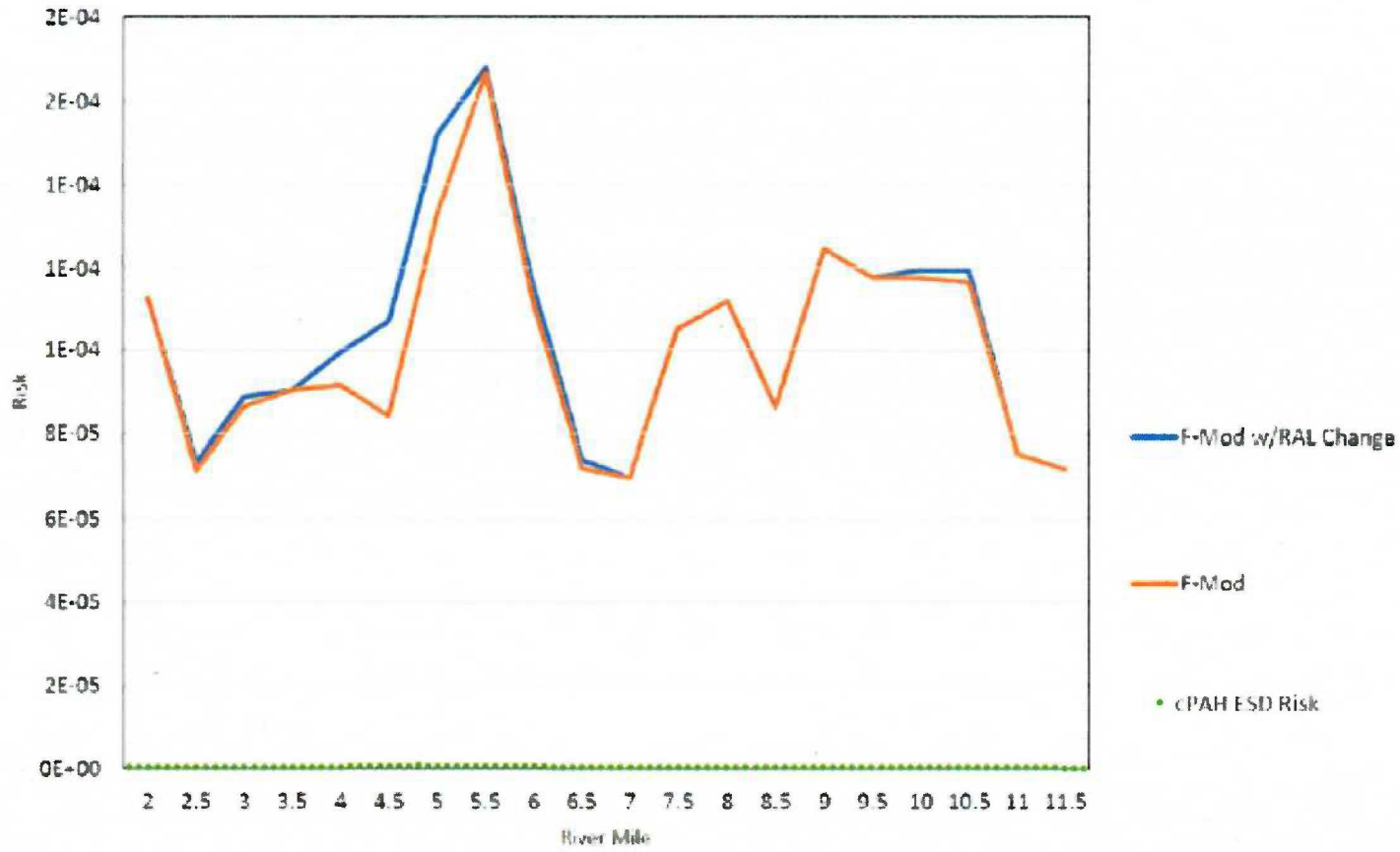
Figure 1
Post-Construction Risks RAO 1 0.5 RMs East and West
Comments to USEPA's Proposed ESD for the Portland Harbor Superfund Site
Terminal 4 Remedy



Notes:
F-Mod wit RAL Change and F-Mod Risk from Proposed ESD Figure 10b.
ESD cPAH Risk estimated by Anchor QEA, LLC.

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Figure 2
Proposed ESD Figure 10b RAO 2 Risk Level – RM Basis (East) with cPAH Risk
Comments to USEPA's Proposed ESD for the Portland Harbor Superfund Site
Terminal 4 Remedy